

ASSIGNMENT 3

Textbook Assignment: "Soils: Surveying and Exploration/Classification/Field Identification." Pages 16-4 through 16-23.

Learning Objective: Identify the purpose of soil exploration. Identify reference sources and their uses in planning soil exploration.

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| <p>3-1. Soil surveys of a proposed construction site provide which of the following information about the soil conditions of that site?</p> <ol style="list-style-type: none">1. The condition of the soil layers2. The drainage characteristics3. The source of possible construction materials4. All of the above <p>3-2. Which of the following types of soil has better internal drainage?</p> <ol style="list-style-type: none">1. Well-graded gravel2. Inorganic clay3. Silty sand4. Organic clay <p>3-3. When you discover that a proposed grade line is below the groundwater table, which of the following actions must be taken?</p> <ol style="list-style-type: none">1. Change the location2. Lower the grade line3. Lower the water table by mechanical means4. Install a water barrier during the construction <p>3-4. At what time interval should the measurement for the groundwater table be taken in a test hole?</p> <ol style="list-style-type: none">1. As soon as water is located2. At high tide3. 24 hours after the hole is bored4. 36 hours after the highest water level is reached <p>3-5. A soil profile provides which of the following information?</p> <ol style="list-style-type: none">1. Location of ledge rock2. Location of the water table3. Identification of the soil layers4. All of the above | <p>3-6. The soil profile does NOT provide information that is useful in determining the finished grade location.</p> <ol style="list-style-type: none">1. True2. False <p>3-7. Which of the following sources of information would provide you with a location of construction materials, as well as locations of sand and gravel pits?</p> <ol style="list-style-type: none">1. Intelligence reports2. Topographic maps3. Agricultural maps4. Geologic maps <p>3-8. An agricultural soils map provides a variety of information on soils to what maximum depth?</p> <ol style="list-style-type: none">1. 72 inches2. 36 inches3. 12 inches4. 6 inches <p>3-9. When reviewing aerial photographs, you observe areas with smoothly rounded slopes. What type of soil does this indicate?</p> <ol style="list-style-type: none">1. Granular2. Plastic3. Bedrock4. Silt deposits <p>3-10. When reviewing aerial photographs, you notice a drainage area. What is indicated by a sudden change in grade or direction of that drainage area in the photograph?</p> <ol style="list-style-type: none">1. Diversion ditches2. Rock formations3. Sand deposits4. All of the above <p>3-11. With proper study of maps and photographs, there should be no need for any field investigation.</p> <ol style="list-style-type: none">1. True2. False |
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- 3-12. Which of the following requirements is true of a test pit excavation?
1. Must be large enough for a man to enter
 2. Must be made with power-driven equipment
 3. Must be below the water table
 4. Load-bearing tests must be performed on soil samples taken every 18 inches
- 3-13. Test holes are best performed on what type of soil?
1. Cohesiveless soil below the water table
 2. Cohesiveless soil above the water table with large aggregate
 3. Cohesive soil
 4. Bedrock
- 3-14. Soil samples obtained by digging test holes are used for which of the following test purposes?
1. Soil classification
 2. Compaction
 3. Moisture Content
 4. Each of the above
- 3-15. What method is commonly used commercially to make deep test holes?
1. Wash boring
 2. Core boring
 3. Drilling
 4. Auger boring
- 3-16. Undisturbed samples are used to test which of the following qualities of the soil?
1. Saturation point
 2. Cohesiveness
 3. Shear strength
 4. Load-bearing strength
- 3-17. You must determine subgrade conditions for construction of a new road. What is the next step once the field reconnaissance has been completed?
1. Develop soil profiles
 2. Classify the soil
 3. Obtain samples for laboratory testing
 4. Perform preliminary borings at appropriate locations
- 3-18. When performing soils investigation on possible borrow areas, you should make borings to what depth?
1. 10 feet
 2. The depth of planned excavation
 3. 2 - 4 feet below anticipated excavation
 4. Same depth as all other borings
- 3-19. When performing soils surveys, which of the following sources should you use to obtain information pertinent to the area?
1. Local contractors
 2. Existing mine shafts or earth cellars
 3. Eroded slopes
 4. All of the above
- 3-20. Detailed soil explorations should be performed at what type of site?
1. Proposed center line
 2. Proposed large cut location
 3. Extreme grade shift
 4. Proposed pavement location
- 3-21. What minimum spacing, if any, is required between boring holes?
1. 25 feet
 2. 50 feet
 3. 100 feet
 4. None
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- Learning Objective: Identify the classification of soils according to the Unified Soil Classification System and solve mathematical problems related to soil classification.
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- 3-22. Highly organic soil is identified by what manner?
1. More than 50 percent passing a No. 200 sieve
 2. 50 percent or more retained on a No. 200 sieve
 3. Determining that the sample is neither a fine-grained nor coarse-grained soil
 4. Visual inspection
- 3-23. The Unified Soil Classification System uses what number of groups for soil classification?
1. Five
 2. Seven
 3. Fifteen
 4. Thirty

- 3-24. Coars-grained sils are divided into what divisions?
1. Silt and sand
 2. Clay and gravel
 3. Sand and gravel
 4. Clay and silt
- 3-25. To classify a coarse-grained soil, you would use what sieve?
1. 1/4 inch
 2. No. 4
 3. No. 50
 4. No. 200
- 3-26. Coarse-grained soils with more than 12-percent fines are classified by what characteristic(s)?
1. Cohesiveness
 2. Liquid limit
 3. Plasticity index
 4. Both 2 and 3 above
- 3-27. For a soil sample to be classified as silty gravel, the plasticity index should be
1. more than 7
 2. between 4 and 7
 3. less than 4
 4. unmeasurable
- 3-28. Coarse-grained soils with between 5- and 12-percent fines are classified in what manner?
1. By dual symbols
 2. As clayey silts
 3. As nonplastic, nonliquid soils
 4. As silty clays
- 3-29. A borderline soil may meet more than one zone requirement.
1. True
 2. False
- 3-30. Fine-grained soils are classified based on what requirement?
1. Plasticity index
 2. Grain-size distribution
 3. Percentage of organic material
 4. Liquid limit
- 3-31. Plastic silts have what group designation?
1. MH
 2. ML
 3. MP
 4. MW

- 3-32. Peat is identified in what manner?
1. By grain-size distribution
 2. By liquid limit determination
 3. By odor
 4. By plasticity index determination
- 3-33. C_u is defined as the coefficient of
1. uniformity of the grain-size curve
 2. gradation
 3. curvature of the gradation curve
 4. distribution
- 3-34. To determine the coefficient of uniformity, you must have what information?
1. Percent retained on the No. 10 and No. 60 sieves
 2. Percent passing the No. 10 and No. 60 sieves
 3. Grain size, in centimeters, at 10- and 60-percent passing levels on the gradation curve
 4. Grain size, in millimeters, at 10- and 60-percent passing levels on the gradation curve

YOU HAVE COMPLETED A SIEVE ANALYSIS WITH THE FOLLOWING RESULTS:

SIEVE SIZE	PERCENT PASSING
1/2 IN.	100
1 IN.	74
3/4 IN.	57
1/2 IN.	40
NO. 4	27
NO. 10	22
NO. 40	14
NO. 60	8
NO. 100	5
NO. 200	3.8

Figure 3A

IN ANSWERING QUESTIONS 3-35 THROUGH 3-39, USE THE INFORMATION FROM FIGURE 3A.

- 3-35. What is the value of D_{60} for this soil sample?
1. 7.2 mm
 2. 20.0 mm
 3. 29.6 mm
 4. 37.3 mm
- 3-36. What is the coefficient of uniformity (C_u) of this soil sample?
1. 18.1
 2. 32.7
 3. 48.9
 4. 66.7

- 3-37 What is the value for D_{30} for this soil sample?
1. 3.0
 2. 4.8
 3. 5.6
 4. 6.2

- 3-38 What is the coefficient of curvature (C_c) of this soil sample?
1. 5.6
 2. 12.7
 3. 21.9
 4. 52.0

- 3-39 What is the classification of this soil sample?
1. GW
 2. GP
 3. SW
 4. SP

Learning Objective: Identify the test procedures used in the field to identify soil characteristics.

- 3-40. Why is it also necessary to perform field identification tests on soils even when laboratory tests are required during soil explorations?

1. To determine which laboratory tests will be omitted
2. To minimize the duplication of laboratory tests samples
3. To provide duplicate results for positive identification
4. To ensure there are no errors in the laboratory tests

- 3-41. What is the best way to gain the necessary skills required for field testing?

1. By working with experienced technicians
2. By receiving formal soils training
3. By getting the "feel" of the soil during the laboratory tests

- 3-42. What is the most useful tool for performing field identification tests?

1. A hand auger
2. A scale or balance
3. A No. 40 sieve
4. A No. 200 sieve

- 3-43. When identifying soils in the field, which of the soil properties should you include in the description of the soil?

1. Color
2. Percentage of sand
3. Maximum particle Size
4. Particle shape

- 3-44. Visual examination is used to establish which of the following properties of the soil?

1. Color
2. Grain distribution
3. Cohesiveness of the soil
4. Grain shape of the fines

- 3-45. When the color of a soil has been identified through a visual examination, what other data should you note regarding the soil condition at the time of identification?

1. Temperature
2. Maximum particle size
3. Chemical content
4. Moisture content

- 3-46. During visual examination of a soil sample, you notice a yellow color. What can you conclude about the soil from this observation?

1. Organic material is present
2. Iron oxides are present
3. The soil has poor drainage capabilities
4. Aluminum compounds are present

- 3-47. What is the first step in approximating grain-size distribution in field identification?

1. Separating the larger particles
2. Examining the coarse-grained soil for gradation distribution
3. Estimating the percentage of fine-grained soil
4. Performing the sieve sampling

- 3-48. You have determined the soil to be coarse-grained and estimated the fines to be 4 percent. What is the soil classification of the soil?

1. GW-GM
2. SW-SM
3. GC
4. Gravel or sand, depending on additional information

- 3-49. Which of the following field tests can be used to determine the cohesiveness of a soil?
1. Ribbon
 2. Roll
 3. Breaking
 4. Each of the above
- 3-50. The breaking, ribbon, and wet-shaking tests are performed on material passing the
1. No. 40 sieve
 2. No. 60 sieve
 3. No. 100 sieve
 4. No. 200 sieve
- 3-51. You have performed the dry-strength test. The sample cannot be powdered but will break with difficulty. What is the classification of the soil?
1. CL
 2. CH
 3. ML
 4. MH
- 3-52. What tests complement each other in giving a clearer picture of the plasticity of the soil?
1. Wet shaking and roll
 2. Ribbon and breaking
 3. Roll and ribbon
 4. Wet shaking and breaking
- 3-53. What is the size of the sample used for the wet-shaking test?
1. A roll of soil 1/2 inch in diameter and 3 inches long
 2. A pat of soil 1/2 inch thick and 1 1/2 inches in diameter
 3. A ball of soil 3/4 inch in diameter
 4. A ball of soil 1 3/4 inches in diameter
- 3-54. A small amount of clay present in your sample will affect your shaking test in what manner?
1. Causes no reaction
 2. Causes a sudden reaction
 3. Retards the reaction
 4. Assists in identifying the sands and silts
- 3-55. The odor test is effective in identifying what type of soils?
1. Organic
 2. Cohesive
 3. Clayey
 4. Oily
- 3-56. What field test can readily identify soil as containing sand, silts, or clay?
1. Acid
 2. Feel
 3. Bite
 4. Shine
- 3-57. To prevent a false test result when performing the acid test, you should prepare your sample in what manner?
1. By heating
 2. By wet-sieve washing
 3. By adding moisture
 4. By adding lime
- 3-58. A positive result of the shine test indicates the
1. lack of clay in the soil
 2. presence of highly plastic clay
 3. presence of peat
 4. lack of plasticity of the sample
- 3-59. To determine the texture of the soil, it is recommended you rub the soil
1. on the back of your hand and allow the sample to dry
 2. on a tender skin area, such as the wrist
 3. between dry fingers
 4. between slightly oiled fingers